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Case Report

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Treatment with direct thrombolytic infusion via mesenteric catheter and thrombectomy in superior mesenteric vein thrombosis due to synthetic drug use

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ABSTRACT

Mesenteric vein thrombosis (MVT) is a rare cause of acute abdomen and accounts for only 5-15% of all acute mesenteric ischemia cases. Symptoms usually begin with nonspecific abdominal pain. Progressively increasing abdominal pain is often accompanied by nausea, vomiting and bloody diarrhea. As the cases usually present with nonspecific symptoms, diagnosis and treatment may be delayed. Anticoagulation, hydration, use of antibiotics, thrombolysis, thrombectomy, and bowel resection are included in the treatment of MVT. We aimed to present a case with a complaint of abdominal pain who underwent interventional thrombectomy and thrombolysis with the diagnosis of superior MVT.

Keywords: Mesenteric vein, venous thrombosis, intervetioanal radiology

INTRODUCTION

Mesenteric vein thrombosis (MVT) is a rare cause of acute abdomen and accounts for only 5-15% of all acute mesenteric ischaemia cases. MVTs are classified as either primary MVT, in which the underlying cause can not be determined, or secondary MVT, in which the etiology can be determined. Symptoms usually begin with nonspecific abdominal pain. Progressively increasing abdominal pain is often accompanied by nausea, vomiting and bloody diarrhea. In severe cases, sepsis and septic shock are seen. As the cases usually present with nonspecific symptoms, diagnosis and treatment may be delayed. Despite advanced diagnostic techniques, high mortality rates are seen. We aimed to present a case with a complaint of abdominal pain who underwent interventional thrombectomy and thrombolysis with the diagnosis of superior MVT.

CASE

A 24-year-old male patient was admitted to the emergency room with severe abdominal pain in September 2022. The patient who had no comorbidities in his anamnesis and used different types of oral synthetic drug tablets, frequently methamphetamine. But he had not used drugs for about 1 month and his abdominal pain had increased in the last few months. In addition to the pain, there was diarrhea that had been going on for a while. The patient was referred to the Interventional Radiology Department following detection of thrombus in the superior mesenteric vein (SMV) and bowel loop edema by Doppler ultrasonography. On physical examination, rebound and defense were not detected, but bowel sounds were hypoactive. He had no gas or feces output in the last 24 hours. Body temperature was 37.2˚C. Laboratory findings were: leukocyte: 8000/mm3 (neutrophil 67%), hemoglobin:11.4g/dL, CRP: 176mg/L, D-Dimer:37.86, APTT:25.2, INR:1.18, prothrombin time:14.3. The patient's hematological tests performed during hospitalization were negative for thrombophilia which may predispose the patient to thrombosis. Contrast-enhanced triphasic computed tomography (CT) was performed and no serious necrosis was observed in the intestines (**Figure 1**).

Lack of enhancement outside the bowel wall suggests venous thrombosis rather than arterial thrombosis. There was no obvious bowel necrosis in the CT images and no rebound or defense was detected in the physical examination.

He was transferred to the Interventional Radiology Unit for transhepatic pharmacomechanical mesenteric vein thrombectomy. A portal vein puncture was carried out on the patient's liver via a 21G needle under local anesthesia, ultrasonography, and scopy. The main portal vein was successfully accessed using a cruiser set and an infusion catheter was inserted (**Figure 2**).

Despite infusion of 0.5 mg/hour tissue plasminogen activator (tPA) for 24 hours, there was still abundant thrombus on venography which showed that the thrombus was chronic (**Figure 3**). Later, mechanical thrombectomy was performed to remove chronic thrombi. Mechanical thromboaspiration was performed using an 8F catheter for approximately two hours, followed by an additional eight hours of thrombolysis and thrombectomy. This led to opening of the trunk portion of the SMV, but the majority of the side branches remained occluded (**Figure 4,5**). The portal vein of the patient was occluded using a coil to avoid complications arising from the administered anticoagulants and medical thrombolysis agents.

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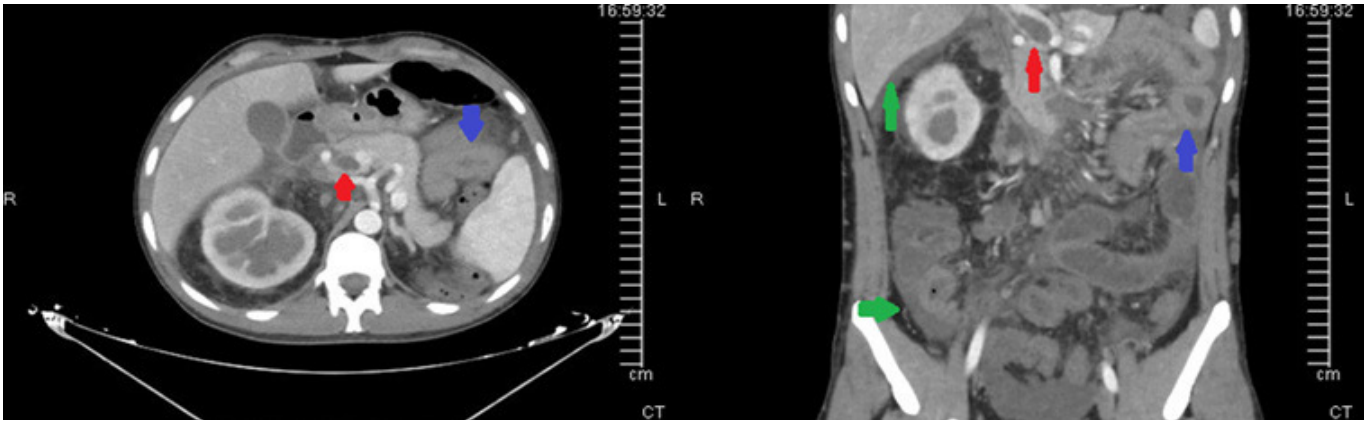

Figure 1. Portal venous phase CT shows thrombus in the SMV truncal segment (red arrow), edema and contrast uptake in the intestinal wall (blue arrow), minimal free fluid (green arrow)

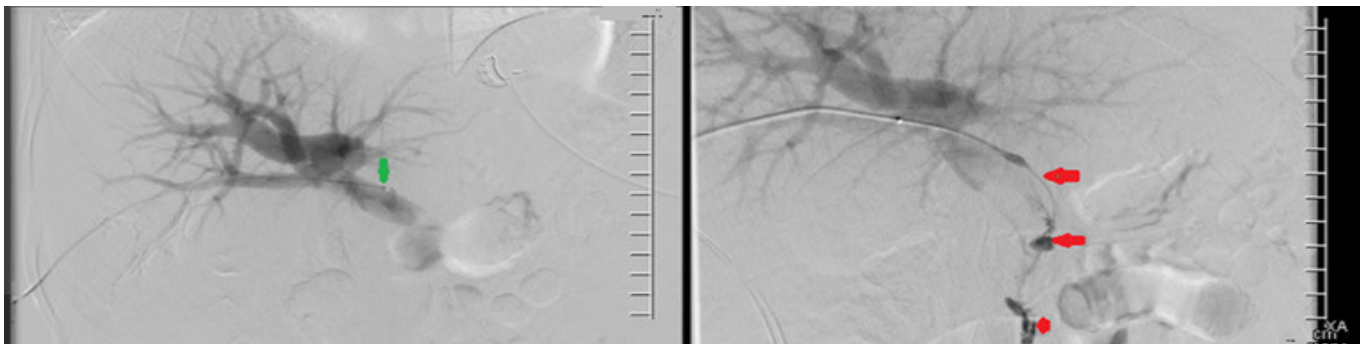

Figure 2. Portal vein is not thrombosed (green arrow). Thrombosed SMV visualized with contrast administered through the inserted infusion catheter (red arrow)

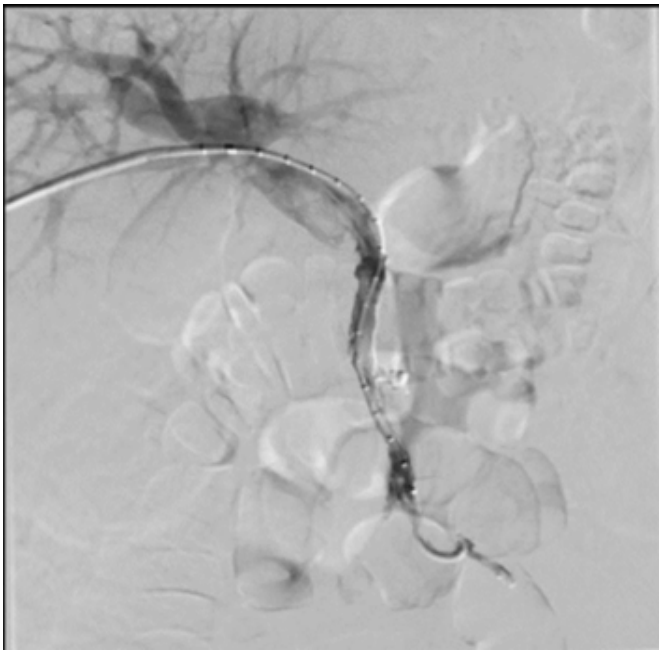

Figure 3. Imaging after 24 hours of tPA infusion shows thrombus in the SMV

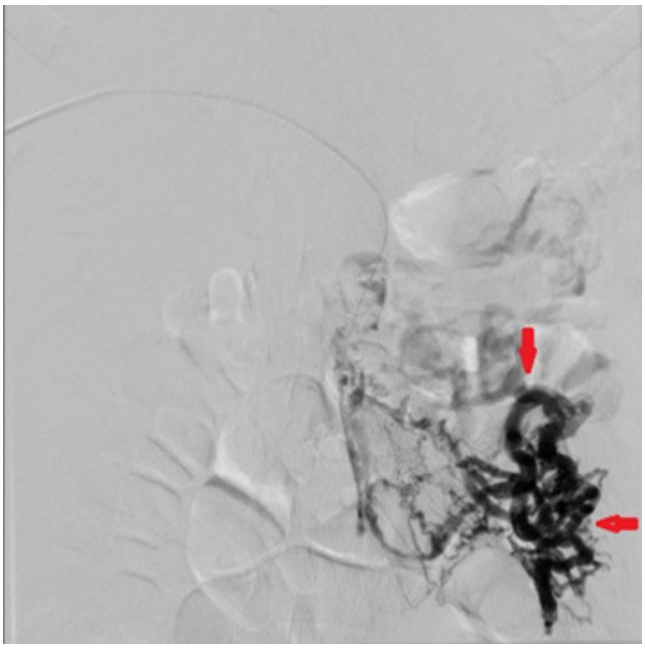

Figure 4. Patency of distal mesenteric vein branches on venography

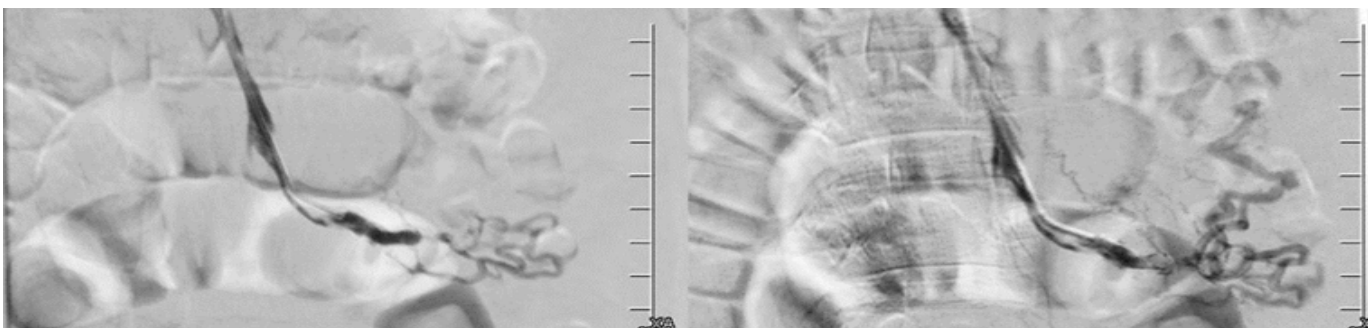

Figure 5. SMV venography after 2nd thrombectomy

In the follow-up of the patient, 2x8000 IU Enoxaparin was used daily. In abdominal CT, chronic thrombus was still observed in the SMV, but partial passage was achieved. The patient's gas and fecal output began. It was ordered to give oral anticoagulants for at least 6 months.

DISCUSSION

The incidence of MVT is approximately 2.0-2.7 per 100,000 people per year and the 5-year survival rate is 70-82%.[1] It is divided into two: idiopathic (primary MVT) and secondary MVT. MVT can occur acute, subacute or chronically. Acute mesenteric vein thrombosis (MVT) is a severe clinical condition where thrombosis occurs in the mesenteric veins along with bowel ischemia. It was initially reported in 1935 in a patient who underwent surgery for acute intestinal ischaemia.[2] Acute MVT, responsible for approximately 5-15% of acute mesenteric ischemia, has a better clinical course than arterial occlusions.[3] The average age of MVT patients is 45-62 years. There is no difference in the incidence between men and women.[1] Our patient was 24 years old, which is considerably younger than the average age reported in the literature.

Early diagnosis of MVT is difficult due to non-specific physical examination and laboratory findings. Clinical suspicion is necessary for rapid diagnosis. Progressive abdominal pain is the most common symptom of MVT. Other symptoms include nausea and vomiting, fever, hematochezia, hematemesis, lack of gas or stool passage, and diarrhea. The time to onset of symptoms in MVT is usually 24-72 hours, and subacute MVT symptoms continue for days or weeks.[4,5] On physical examination, abdominal tenderness is observed in 80% of the cases. Signs of peritonitis are observed in 10%, and blood is observed on rectal examination in 23%.[4-7]

Laboratory findings reveal metabolic acidosis, leukocytosis, elevated lactate levels and increased D-dimer values.[8] A progressive abdominal pain was seen over the months in our patient. At the time of admission to the hospital, there was no gas or fecal output for the 24 hours. In the physical examination, bowel sounds were hypoactive, and rebound or defense was not detected. There was no leukocytosis in laboratory results. However, CRP and D-dimer levels were high.

Imaging techniques are important in the diagnosis of MVT. Contrast-enhanced CT is the standard imaging method for identifying MVT. However, CT angiography is the most sensitive method.[9,10] The imaging protocol includes both arterial and portal venous phases. Administration of oral contrast should be avoided as it may mask the enhancement in the intestinal Wall. An occlusive embolism or thrombus occurs when an arterial vessel suddenly fails to opacify and is called a "vessel cut sign". Superior mesenteric artery (SMA) thrombosis or embolism is a highly specific finding in a patient with clinically suspected acute mesenteric ischemia (AMI). MVT, appears as no opacification or intraluminal filling defects in the mesenteric vessels. Non-occlusive thrombus typically presents as a filling defect.[11] While the sensitivity of CT in the diagnosis of acute MVT is 100%, it has been reported to be 93% in chronic MVT.[9] Non-vascular CT Finding; pneumatosis intestinalis and portomesenteric venous gas, changes in bowel wall thickness, decreased or absent bowel wall enhancement, bowel luminal dilation, mesenteric fat stranding and ascites, pneumoperitoneum.[11] Other imaging methods include abdominal Doppler ultrasonography and Magnetic Resonance Imaging, but they do not have any superiority over CT. In our patient, Doppler ultrasonography revealed SMV thrombus and edema in the bowel loops.

Despite advanced diagnostic methods, a mortality rate of 15-40% has been reported in the literature due to delays in diagnosis of MVT.[9,12] If MVT is not treated early, mortality and morbidity become greater.[13,14] Heparinization is the main treatment option for thrombolysis treatment, and early heparinization has been shown to delay disease progression and recurrence significantly.[15] In addition to anticoagulant treatment, tPA is also an option. Thrombolytic treatment can be lifesaving, especially in early diagnosed and symptomatic cases. It may obviate the requirement for bowel resection or facilitate treatment with a shorter segmental resection. Today, transcatheter tPA infusion is preferred instead of intravenous tPA infusion in mesenteric and portal vein thrombosis. Percutaneous or transhepatic thrombolytic therapy is suggested when anticoagulation therapy does not seem to be efficient or in cases where there is no evidence of intestinal ischemia. Slow tPA infusion directly into the thrombus, in combination with interventional radiology techniques, considerably enhances the treatment's efficacy.[3,7,16,17] Liu et al.[18] found that the effectiveness of direct injection of a thrombolytic agent into the catheter in 46 patients with portal vein and SMV thrombosis significantly improved the thrombolytic effect and reduced associated bleeding complications. In our case, tPA infusion was performed via the infusion catheter after the cruiser set was placed into the main portal vein. No complications, such as bleeding, hematoma, infection or embolism were observed.

Surgical complications include short bowel syndrome, wound infection, sepsis, pulmonary embolism and gastrointestinal bleeding. It has been reported that within 6 weeks after surgical resection, 14% of patients may experience a recurrence of MVT.[19] In our case, there were no signs of peritonitis on physical examination, and no non-contrast-enhancing area on the bowel wall that would suggest bowel ischemia was detected on CT images. Surgery was not considered because gas and feces passage began after thrombectomy. In recent years, interventional radiological treatment has been popular for MVT. With interventional treatment, the length of hospital stay can be considerably reduced, recovery can be accelerated and the vessels of the infarcted intestinal tract can be repaired within a short time.[20] The incidence of acute renal failure, lung failure and death is lower in interventional treatment compared to surgical treatment. As a result, prognosis improves significantly with radiological interventional treatment.[21] In our patient, the SMV occlusion was almost completely opened with interventional treatment and no surgery was required.

In our case, since the cause of thrombus could not be explained by laboratory markers, history of synthetic oral drug use was the most likely risk factor for SMV thrombus. It suggests that chronic MVT is caused by the prothrombogenic effect of the synthetic drug. Successful treatment was achieved without the need for surgery by rapid diagnosis and interventional methods, with serial tPA infusion through the catheter followed by thrombectomy.

CONCLUSION

Early diagnosis and rapid initiation of treatment are the main reasons affecting mortality and morbidity in MVT. Direct injection of a thrombolytic agent into the portal vein and SMV with a catheter significantly improves the thrombolytic effect and reduces associated bleeding complication. We recommend that early interventional treatment as it reduces mortality and morbidity in MVT cases.

ETHICAL DECLARATIONS

Informed Consent: The patient signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declared that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Demelo-Rodríguez P, Ordieres-Ortega L, Oblitas CM. Mesenteric venous thrombosis. *Med Clin (Barc).* 2023:160(9):400-406. English, Spanish. doi: 10.1016/j.medcli.2023.01.020
2. Warren S, Eberhard TP. Mesenteric venous thrombosis. *Surg Gynecol Obstet.* 1935;61:102-121.
3. Kumar S, Sarr MG, Kamath PS. Mesenteric venous thrombosis. *N Engl J Med*. 2001:345(23):1683-1688. doi: 10.1056 /NEJMra010076)
4. Al Salamah SM, Mirza SM. Acute mesenteric venous thrombosis: management controversies. *K Pract*. 2004;11(4):242-247.
5. Rhee RY, Gloviczki P. Mesenteric venous thrombosis. *Surg Clin North Am*. 1997:77(2):327-338.
6. Wijaya R, Ng JH, See AH, Kum SW. Open thrombectomy for primary acute mesentericoportal venous thrombosis-should it be done? *Annals Vasc Surg.* 2015:29(7):1454.e21-1454.e25. doi: 10.1016/j.avsg.2015.05.003
7. Juniku-Shkololli A, Gjikolli B, Hoti KD, et al. A rare complication with superior mesenteric vein thrombosis after laparoscopic sleeve gastrectomy: a case report. *Radiology Case Reports.* 2023:18(9):3020-3025. doi: 10.1016/j.radcr.2023.05.075
8. Kim HK, Hwang D, Park S, Lee JM, Huh S. Treatment outcomes and risk factors for bowel infarction in patients with acute superior mesenteric venous thrombosis. *J Vasc Surg Venous Lymphat Disord.* 2017:5(5):638-646. doi: 10.1016/j.jvsv.2017.04.011
9. Bayraktar B, Çolak Y, Eren T, et al. Acute superior mesenteric venous thrombosis: a case report and review of the literature. *Türkiye Klinikleri Tıp Bil Derg.* 2012:32(5):1405-1409. doi: 10.5336/medsci.2010-20838
10. Eastwood KA, Vaughan A, McCune KH. Mesenteric vein thrombosis associated with anti-thrombin III deficiency. *Ulster Med J.* 2009:78(1):53-55.
11. Hang Y, Kirkpatrick IDC. An update on acute mesenteric ischemia. *Can Assoc Radiol J.* 2023:74(1):160-171. doi: 10.1177/08465371221094280
12. Choudhary AM, Grayer D, Nelson A, Roberts I. Mesenteric venous thrombosis: a diagnosis not to be missed! *J Clin Gastroenterol.* 2000:31(2):179-182. doi: 10.1097/00004836-200009000-00021.Chand R, Adam E M, Healey ET. Essential interventional radiology review. *Springer Nature Switzerland.* 2022.
13. Sidawy A, Perler B. Rutherford's vascular surgery and endovascular therapy. 9th ed. Elsevier; 2018.
14. Hrstic I, Kalauz M, Cukovic-Cavka S, Ostojic R, Banfic L, Vucelic B. Treatment of extensive subacute portal, mesenteric and ileocolic vein thrombosis with recombinant tissue plasminogen activator. *Blood Coagul Fibrinolysis*. 2007:18(6):581-583. doi: 10.1097/MBC.0b013e328285d822
15. Goitein D, Matter I, Raziel A, et al. Portomesenteric thrombosis following laparoscopic bariatric surgery: incidence, patterns of clinical presentation, and etiology in a bariatric patient population. *JAMA Surg.* 2013:148(4):340-346. doi: 10.1001/jamasurg.2013.1053
16. Çetinkünar S, Erdem H, Aktimur R, et al. The effect of laparoscopic sleeve gastrectomy on morbid obesity and obesity-related comorbidities: a cohort study. *Ulus Cerrahi Derg.* 2015:31(4):202-206. doi: 10.5152/UCD.2015.2993
17. Liu FY, Wang MQ, Fan QS, Duan F, Wang ZJ, Song P. Interventional treatment for symptomatic acute-subacute portal and superior mesenteric vein thrombosis. *World J Gastroenterol.* 2009:15(40):5028-5034. doi: 10.3748/wjg.15.5028
18. Oguslu U, Uyanik SA, Cenkeri HÇ, Atli E, Yilmaz B, Gümüş B. Transhepatic pharmacomechanical thrombectomy of symptomatic acute noncirrhotic, nonmalignant portomesenteric venous thrombosis: midterm results. *AJR Am J Roentgenol.* 2021:217(2):418-425. doi: 10.2214/AJR.20.23150
19. Rabuffi P, Vagnarelli S, Bruni A, Antonuccio G, Ambrogi C. Percutaneous pharmaco-mechanical thrombectomy of acute symptomatic superior mesenteric vein thrombosis. *Cardiovasc Intervent Radiol.* 2020:43(1):46-54. doi: 10.1007/s00270-019-02354-y
20. Arthurs ZM, Titus J, Bannazadeh M, et al. A comparison of endovascular revascularization with traditional therapy for the treatment of acute mesenteric ischemia. *J Vasc Surg.* 2011:53(3):698-705. doi: 10.1016/j.jvs.2010.09.049